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Application of study design in research

Dr/ Nashwa Nabil

Lecturer of Public health ,Preventive and Social Medicine

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- **Objectives (Learning outcomes)**
- Identify Types of studies
  - ❖Descriptive Observational studies
  - ❖Analytical observational study
  - ❖Interventional study
  - ❖Calculate Odds ratio and relative risk

1- Cross-Sectional Study * Prevalence Survey *

It is examination of a cross – section of a particular population at one point in time. The investigator measures the outcome and exposure at the same time.

What is Prevalence

- No. of new as well as Old cases of a disease or health related event in a given population in a given time

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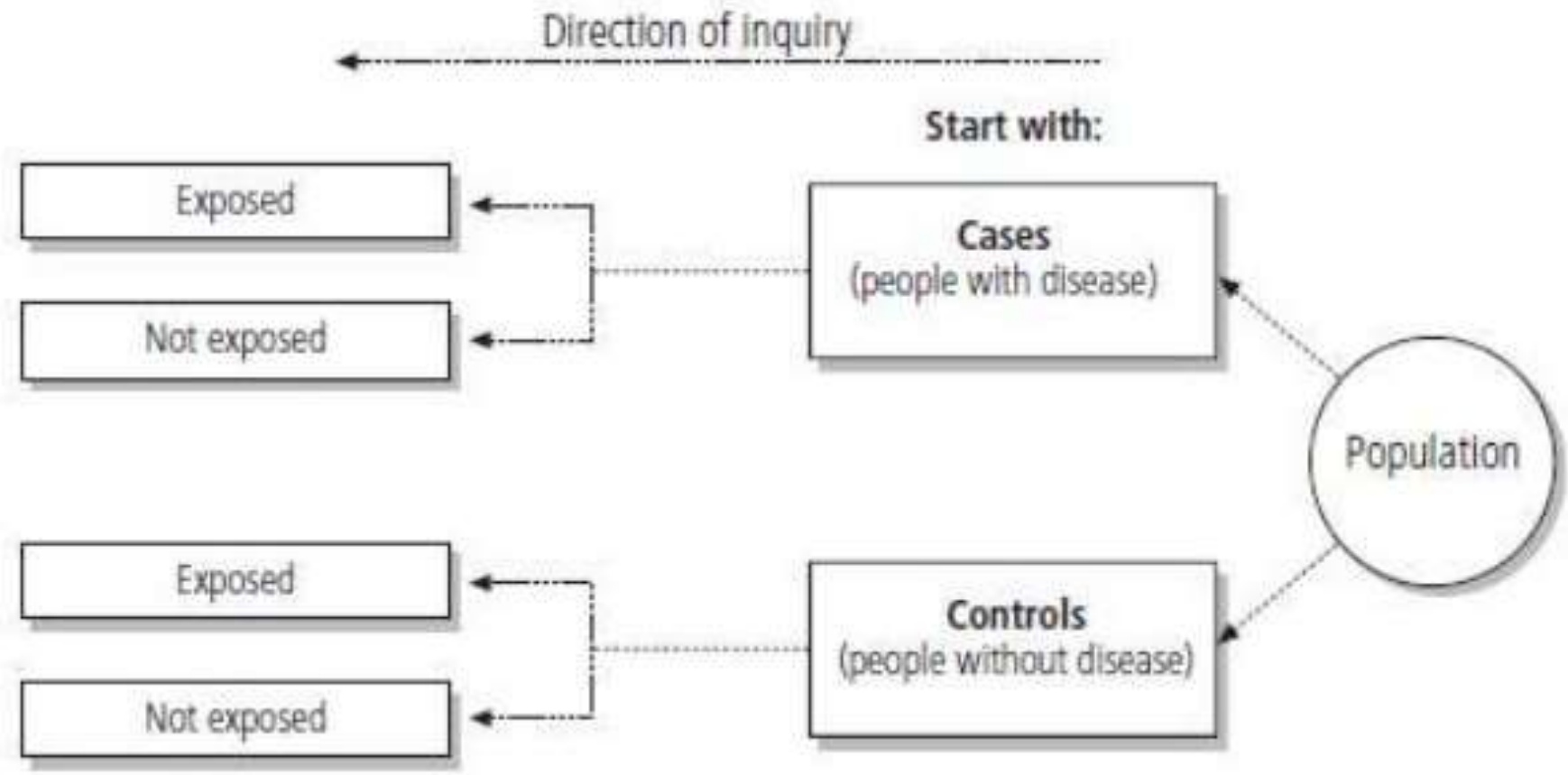
- Total Population at risk in a given time

Case Control study



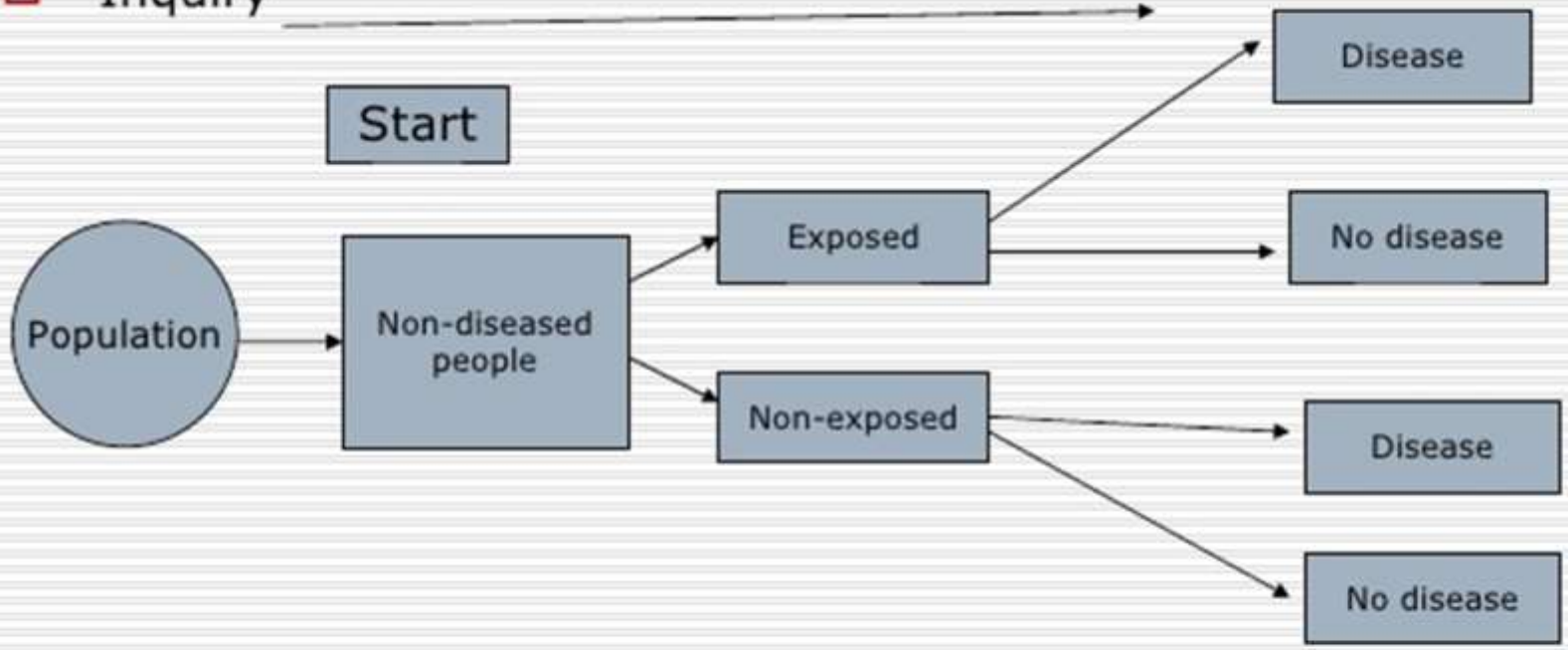
	Cases	Control
E+	a	b
E-	c	d

Exposure	Disease	
	Yes	No
Yes	a	b
No	c	d
Total	a+c	b+d

$$\text{Odds Ratio} = ad/bc$$

Design of Cohort study - I

- Time
- Inquiry



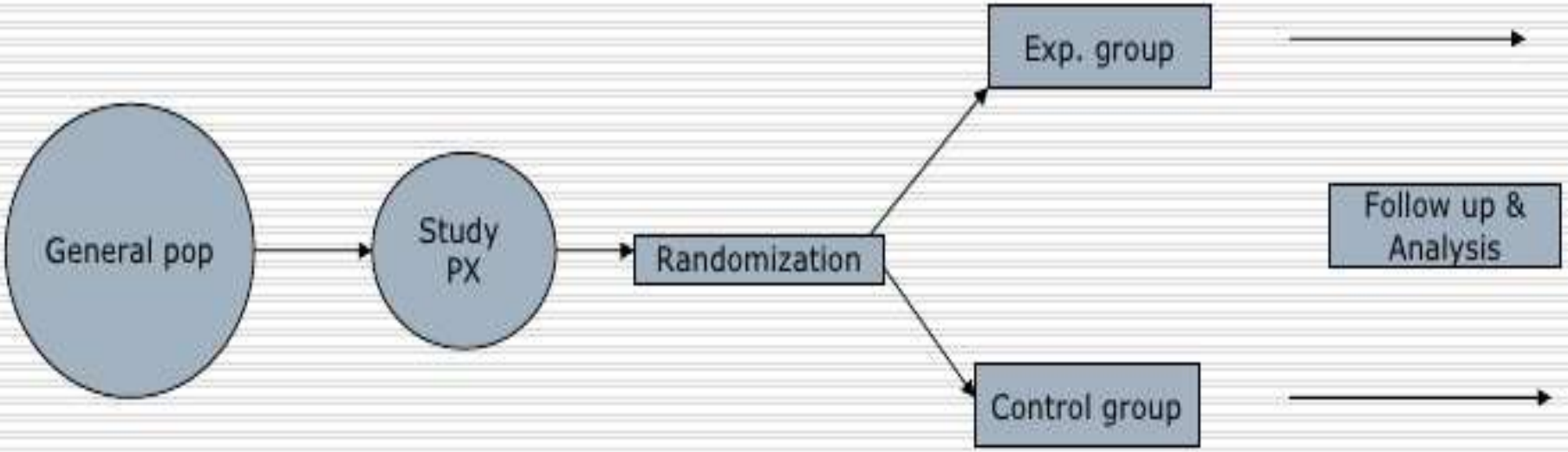
Exposure	Disease		Total
	Yes	No	
Yes	a	b	a+b
No	c	d	c+d

Incidence rate among exposed=(a/a+b)*10^x

Incidence rate among non-exposed=(c/c+d)*10^x

$$\text{Relative Risk} = \frac{(a/a+b)}{(c/c+d)}$$

Design of Randomized controlled trial - I



In a rural region a sample of 7000 women in their reproductive age (19-45 years old),married and had at least one child are examined for anemia and asked about current use of IUD with the results summarized in the following chart.

7000 women married and had at least one child

Exposure :Current IUD use

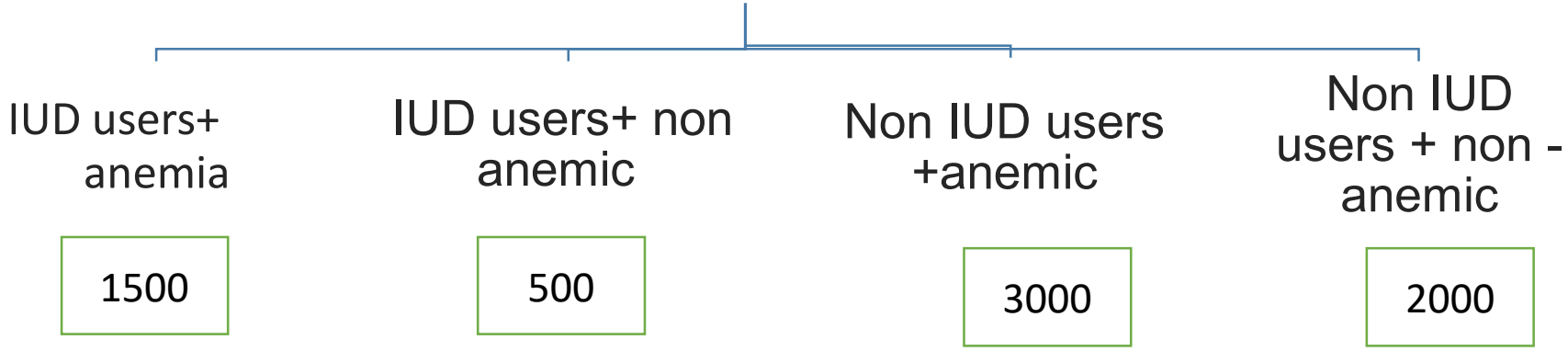
Outcome :Anemia

IUD users+ anemia	IUD users+ non anemic	Non IUD users +anemic	Non IUD users + non - anemic
1500	500	3000	2000

7000 women married and had at least one child

Exposure :Current IUD use

Outcome :Anemia



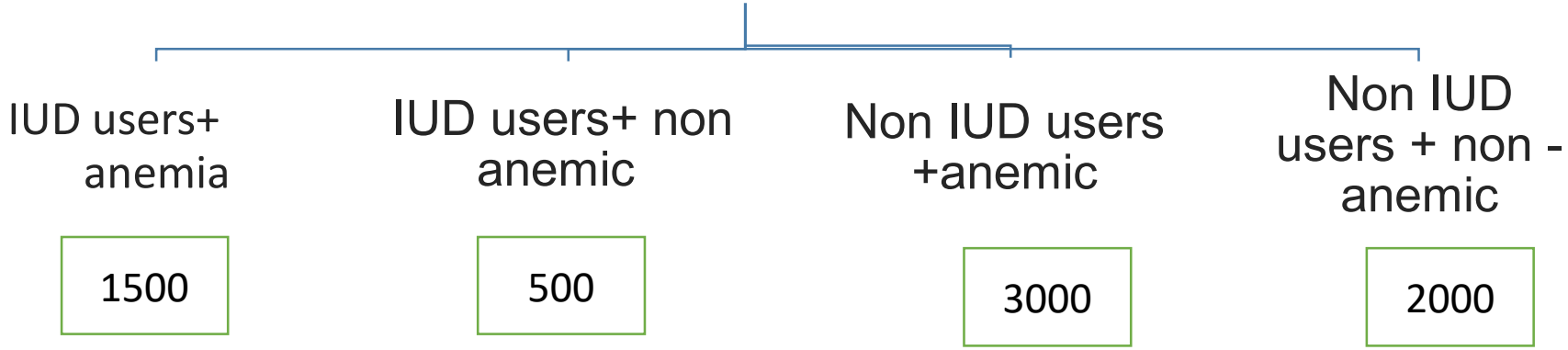
calculate the following

1. Prevalence of anemia
2. Prevalence of anemia among current IUD users
3. Prevalence of anemia among current IUD non users
4. Prevalence of current use of IUD

7000 women married and had at least one child

Exposure :Current IUD use

Outcome :Anemia



calculate the following

1. Prevalence of anemia =4500/7000=64.3%
2. Prevalence of anemia among current IUD users=1500/2000=75%
3. Prevalence of anemia among current IUD non users=3000/5000=60%
4. Prevalence of current use of IUD =2000/7000=28.6%

In a study the relationship between thromboembolism & use of contraceptive pills , the past history of using contraceptive pills was collected from 58 women with thromboembolism and 116 healthy women . The following results were obtained.

1-What is the type of this study?

2-Calculate odds ratio.

3-Advantages and disadvantages of this study

	Thromboembolism	No thromboembolism	Total
Use contraceptive pills	26	10	36
Not use contraceptive pills	32	106	138
Total	58	116	174

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	Thromboembolism	No thromboembolism	Total
Use contraceptive pills	26 a	10 b	36
Not use contraceptive pills	32 c	106 d	138
Total	58	116	174

- **Type of study** : longitudinal retrospective case control analytical study.
- **Odds ratio = odds of exposure in cases (a/c) / odds of exposure in control (b/d) = ad / bc** = 26* 106/ 10* 32 =8.6
- Odds ratio > 1: this mean positive association between exposure & disease.

How to interpret the OR?

People who use oral contraceptives have an 8.6 times higher risk of developing thromboembolism compared to those who do not use oral contraceptives

To study the relationship between smoking and coronary heart disease, a study was conducted on 4550 subjects. They were classified to smoker(3350) and non smoker (1200) , then they are followed for 10 years for the occurrence of coronary heart diseases. At the end of the study, coronary heart diseases was diagnosed in (900) subjects among non smokers and (2555) among smoker.

1-What is the type of this study ?

2-Calculate the Risk indices.

3-What are the Advantages and disadvantages of this study?

	Smoker	Non smoker	Total
Coronary heart disease +ve	2555	900	3455
Coronary heart disease -ve	795	300	1095
Total	3350	1200	4550

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	Smoker	Non smoker	Total
Coronary heart disease +ve	2555 a	900 c	3455
Coronary heart disease -ve	795 b	300 d	1095
Total	3350 a + b	1200 C+ d	4550

- Type of study : longitudinal prospective cohort study .

1) **Cumulative incidence :**

New cases of certain disease / population at risk of this disease.

C.I in exposure = a/a+b= 2555/3350=0.76

C.I in non exposure = c/c+d=900/1200=0.75

2) Relative risk:

CI of exposure/ CI of unexposed.= 0.76/0.75=1.01

3)Attributable risk:

CI of exposed - CI of unexposed=0.76-0.75= 0.01

In a clinical Trial of new drug for Diabetes incidence of side effects in the group was using old drug (control group) was 40% while with the group was using new drug (investigating group) was 20 %

Is this new drug effective ? & calculate degree of efficacy of new drug ?

- **The new drug is effective**
- **The degree of efficiency of Drug is calculated by relative risk reduction.**
- **RRR= CER-EER/CER = 40-20 / 40 = .5**

.5 * 100 = 50%

So, Risk is reduced by about 50 %

What is the type of study

1. **British investigators conducted a study to compare intranasal influenza vaccine history among 1,294 children with development of Guillain barrie syndrome and 4,469 children without such disorders. (They found no association.) This is an example of which type(s) of study?**

What is the type of study

1. British investigators conducted a study to compare intranasal influenza vaccine history among 1,294 children with development of Guillain barrie syndrome and 4,469 children without such disorders. (They found no association.) This is an example of which type(s) of study?

- Answer : Case control study

What is the type of study

- To study the relationship between prolonged exposure to asbestos and lung cancer , a study was conducted on 2000 subjects working in factory . They were classified to prolonged exposed to asbestos (300) and non exposed to asbestos (700) , then they are followed for 5 years for the occurrence of lung cancer.

What is the type of study

- **To study the relationship between prolonged exposure to asbestos and lung cancer , a study was conducted on 1000 subjects working in factory . They were classified to prolonged exposed to asbestos (300) and non exposed to asbestos (700) , then they are followed for 5 years for the occurrence of lung cancer.**

- **Answer : cohort study**

Thank You!